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RESEARCH ARTICLE

A review of the Neotropical moth genus *Bardaxima* (Lepidoptera: Notodontidae: Nystaleinae), with special reference to the species occurring in Brazil

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ABSTRACT. *Bardaxima* Walker, 1858 includes 12 species, eight of them occurring in Brazil. The Brazilian species are treated here, including diagnoses and illustrations of both adults and genitalia to allow their identification: *B. donatian* (Schaus), *B. fulgurifera* (Walker, 1869), **stat. rev.** (= *demea* (Druce, 1895)); *B. ionia* (Druce, 1900) (= *albolimbata* (Dognin, 1909), **syn. nov.**, *B. ambigua* (Dyar, 1908), **syn. nov.**, *B. metcalfi* (Schaus, 1928), **syn. nov.**); *B. lucilinea* Walker, 1858; *B. marcida* (C. Felder, 1874); *B. procne* (Schaus, 1892) (= *meyeri* (Schaus, 1928), **syn. nov.**); *B. sambana* (Druce, 1895), **stat. rev.** (= *belizensis* Thiaucourt, 2010, **syn. nov.**, *bolivari* Thiaucourt, 2010, **syn. nov.**, *coloradorum* Thiaucourt, 2010, **syn. nov.**, *panamensis* (Draudt, 1932), **syn. nov.**); *B. subrutila* (Dognin, 1908); and *B. terminalba* Jones, 1908 (= *oakley* (Schaus, 1939)). *Bardaxima perses* Druce, 1900 is transferred to *Elasmia* Möschler, 1883 as a new combination, *Elasmia perses* (Druce, 1900). *Stragulodonta* **gen. nov.** is proposed to accommodate *Heterocampa stragula* Möschler, 1883, **comb. nov.** (= *belua* (Draudt, 1932), **syn. nov.**).

KEY WORDS. Brazil, distribution, *Elasmia*, *Stragulodonta*, synonymy, taxonomy.

INTRODUCTION

Bardaxima Walker, 1858 is a Neotropical genus that included 17 species, three of them described from Brazil (Becker 2014: 3). It ranges from Guatemala to Southern Brazil. Draudt (1932: 915) included eight species, of which six recorded from Brazil. Schintlmeister (2013: 50) included seven species. However, both Draudt (1932: 987) and Schintlmeister (2013: 181–182) treated *Gisara* Schaus, 1901, currently a synonym, as a valid genus, including nine and 11 species, respectively. This synonymy was first proposed by Weller (1995), a treatment recognized by Thiaucourt (2010) and by Becker (2014: 3). The present study treats the eight species of the genus recognized from Brazil, brings new information on the classification and provides illustrations, both of adults and their male genitalia, to allow the identification of the Brazilian species. In order to clarify the identity of the Brazilian species, other taxa, not occurring in the country, had to be examined and some useful information about them, including synonymies, are also given here.

MATERIAL AND METHODS

Abbreviations. (AM) Amazonas State, Brazil; (AMC) Alfred Moser Collection, São Leopoldo, Rio Grande do Sul, Brazil; (FW) Forewing. (g.s.) genitalia slide; (HW) Hind wing; (RJ) Rio de Janeiro State, Brazil; (MfN) Museum für Naturkunde der Humbold-Universität zu Berlin, Germany; (NHMUK) Natural History Museum, United Kingdom; (SC) Santa Catarina State, Brazil; (SP) São Paulo State, Brazil; (USNM) United States National Museum, Washington; (VOB) Vitor O. Becker collection, Serra Bonita Reserve, Camacan, Bahia, Brazil.

This review is based on 200 specimens: 157 (26 g.s.) in VOB, 43 in AMC, and on the type-material in the USNM and the NHMUK. Synoptic collections representing all the species in VOB were taken to the last two institutions and compared with their collections. Genitalia were prepared following the methods described by Robinson (1976). Terms for morphological characters follow Hodges (1971).

TAXONOMY

The examination of the material revealed that *Bardaxima*, originally composed of 17 species, is reduced to 12 species (eight species from Brazil); two are reinstated as valid species, eight are junior synonyms, one is transferred to *Elasmia* Möschler, 1883 and one to a new genus, *Stragulodonta* Becker, gen. nov.

Nomenclatural summary

Bardaxima Walker, 1858
  Gisara Schaus, 1901
  Gozarta Walker, 1869
    brauni (Schaus, 1928) (*Gisara*), Colombia
    brewsteri (Schaus, 1928) (*Gisara*), Costa Rica
    dissona Draudt, 1932, Peru
    donatian (Schaus, 1928) (*Gisara*), Guianas to Brazil
    fulgurifera (Walker, 1869) (*Gozarta*) stat. rev., Guatemala to Brazil
      demea (Druce, 1895) (*Nysalea*)
    ionia (Druce, 1900) (*Heterocampa*), Costa Rica to Brazil and Bolivia
      albolimbata (Dognin, 1909) (*Gisara*) syn. nov.
      ambigua (Dyar, 1908) (*Gisara*) syn. nov.
      metcalfi (Schaus, 1928) (*Gisara*) syn. nov.
    lucilinea Walker, 1858 Brazil, Peru
    marcida (C. Felder, 1874) (*Nystalea*), Colombia to Brazil
    procne (Schaus, 1892) (*Symmerista*), Guianas to Brazil
      meyeri (Schaus, 1928) (*Gisara*) syn. nov.
    sambana (Druce, 1895) (*Nystalea*) stat. rev., Guatemala to Brazil
      belizensis Thiaucourt, 2010 syn. nov.
      bolivari Thiaucourt, 2010 syn. nov.
      coloradorum Thiaucourt, 2010 syn. nov.
      panamensis (Draudt, 1932) syn. nov.
  subrutila (Dognin, 1908) (*Gisara*), French Guiana, Brazil
  terminalba Jones, 1908, Brazil
    oakleyi (Schaus, 1939) (*Navarcostes*)

Elasmia Möschler, 1883
  perses (Druce, 1900) (*Heterocampa*) comb. nov. Costa Rica to Brazil
    demera (Schaus, 1901) (*Bardaxima*)

Stragulodonta gen. nov.
  stragula (Möschler, 1883) (*Heterocampa*) comb. nov. Surinam to Brazil.
    belua (Draudt, 1932) (*Bardaxima*) syn. nov.

Bardaxima Walker, 1858

Bardaxima Walker, 1858: 1349. Type-species: *B. lucilinea* Walker, 1858: 1349, by monotypy.

Gisara Schaus, 1901: 261. Type-species: *Symmerista procne* Schaus, 1892, by original designation. Synonymized by Weller (1995: 235).

Gozarta Walker, 1869: 18. Type-species: *G. fulgurifera* Walker, 1869a: 18, by monotypy. Preocc. (Walker 1869b [Hemiptera]). Synonymized by Gaede 1934: 210.

Diagnosis. Medium (FW length 18 mm; 42 mm wingspan) to large (FW length 30 mm; 64 mm wingspan) size. Brown, fuscous or gray. Antenna short ciliated in males, filiform in females, ¾ as long as FW. Labial palpi upcurved, reaching vertex; 2nd segment length the size of eye diameter; 3rd half the size, thin. Abdomen tip with pair of coremata, looking bifurcate. Male genitalia: Uncus tip bifurcate, forming with socii a four-branched structure.

Key to the *Bardaxima* species

1. FW dorsally with short white dash distad of upper end of cell (*lucilinea*-group) 2
1′. FW dorsally without short white dash distad of upper end of cell 4
2. HW fuscous 3
2′. HW whitish ..... *donatian*
3. FW dorsally with no contrasting dark brown spots, with a diffuse white dot near tornus ..... *lucilinea*
3′. FW dorsally with no contrasting dark spots, with no diffuse white dot neat tornus ..... *furcifera*
4. FW dorsally with the area along termen, above tornus, lighter than ground color, usually not reaching edge (*ionia*-group) 5
4′. FW dorsally with the area along termen, above tornus, white, reaching edge (*procne*-group) 7
5. White area near tornus of FW dorsally reduced to a diffuse round blotch ..... *marcida*
5′. White area near tornus extending to mid termen 6
6. FW dorsally with a small, round black dot at end of cell ..... *ionia*
6′. FW dorsally with a short, vertical dark dash at end of cell ..... *subrutila*
7. Thorax dorsally with a conspicuous white dot at middle ..... *procne*
7′. Thorax dorsally without a conspicuous white dot at middle 8
8. FW dorsally with conspicuous white mark near base ..... *dissona*
8′. FW dorsally without conspicuous white mark near base 9
9. FW dorsally with area above fold dark fuscous ..... *brauni*
9′. FW dorsally with ground color uniformly gray 10
10. HW whitish ..... *brewsteri*
10′. HW fuscous 11
11. FW length 20 mm or less ..... *terminalba*
11′. FW length 22 mm or more ..... *sambana*

lucilinea-group

This group includes the three species with a short white dash on FW dorsally, distad of upper end of cell.

Bardaxima lucilinea Walker, 1858

Figs 1–3, 39–41

Bardaxima lucilinea Walker, 1858: 1349. Holotype male, BRAZIL: [RJ], 'Brazil', no further data (NHMUK) [examined].

Diagnosis. Brown. Male (Figs 1, 3) FW length 25–28 mm (56–64 mm wingspan); female (Fig. 2) FW length 30–35 mm (66–78 mm wingspan). FW with costal half pale brown; a short white dash beyond cell, on M1; a blackish crescent patch on dorsum, near base; a faint, irregular, white dot next to tornus. HW fuscous, cilia white. Male 8th sternite (Fig. 41) round, distal margin with deep indentation. Male genitalia (Fig. 39): uncus long, forked. Socii small, thin. Valva long, broad, tapering slightly distad; costa straight; sacculus long, ending before tip of valva; a strong, blunt tooth at middle. Aedoeagus (Fig. 40) curved ventrad; vesica with small cornutus.

Figures 1–8. *Bardaxima* specimens, dorsal view: (1–3) *B. lucilinea*: (1) male, Porto Seguro, Bahia, Brazil; (2) female, Açailândia, Maranhão, Brazil; (3) male holotype, Rio de Janeiro, Brazil. (4–8) *B. fulgurifera*: (4) female, Bijagua, Alajuela, Costa Rica; (5) male, Monteverde, Puntarenas, Costa Rica; (6) female, Los Bancos, Pichincha, Ecuador; (7) male, Porto Velho, Rondônia, Brazil; (8) female holotype, Honduras.

Material studied. Type; 18 males (g.s.: 4157, 5601), 2 females (VOB); 12 males, 2 females (AMC).

Distribution. From Peru and Brazil, in the Amazonian lowlands, south to Santa Catarina.

Remarks. This and *B. fulgurifera* are the larger species in the genus, very similar to each other and for this reason have been

considered synonyms by most authors (Schaus 1901, Draudt 1932, Becker 2014). The pattern of the FW in *B. lucilinea* is more "smooth" and shows a faint, white mark next to tornus; whereas the FW has multiple, minute dark dots, contrasting with the ground color, in *B. fulgurifera*. Genitalia are also similar but the differences, though small, are consistent, very noticeable in the shape of uncus and sacculus. In *B. lucilinea* the uncus branches and the distal tooth at the distal third of sacullus is thicker than that of *B. fulgurifera*.

Bardaxima fulgurifera (Walker, 1869), stat. rev.

Figs 4–8, 42–44

Gozarta fulgurifera Walker, 1869: 18. Holotype female, [HONDURAS: Cortés, La Lima] "Limas" [no further data] (NHMUK) [examined].

Nystalea demea Druce, 1895: 50. Lectotype male, COSTA RICA: [San Jose] "Candelaria Mts" (NHMUK), here designated [examined]. Synonymized by Schaus (1901: 271).

Diagnosis. Brown. Male (Figs 5, 7, 8) FW length 26–30 mm (58–68 mm wingspan); female (Figs 4, 6) FW length 30–37 mm (68–82 mm wingspan). FW with costal half pale brown; a short silvery dash beyond cell, on M1; a diffuse, blackish crescent patch on dorsum, near base; a series of faint, irregular, pale dots before termen, followed by a series of blackish dots on vein interspaces. Distal margin of 8th male sternite (Fig. 44) with deep indentation. Male genitalia (Fig. 42): uncus branches thin, long. Socii long, thin, curved ventrad. Valva long, broad; costa slightly curved; sacculus long, broad, with a small sharp tooth at distal third. Aedoeagus (Fig. 43) curved distad; vesica with long cornutus and three smaller ones.

Material studied. Types; 12 males (g.s. 4158, 5602, 5603), 8 females (VOB); 3 males (AMC).

Distribution. From Belize and Guatemala, Honduras, Costa Rica, Ecuador, south to Bahia, Brazil.

Remarks. Described from an unspecified number of males and females, presumably the pair currently in the NHMUK. The male, mentioned above, is here selected and designated as lectotype; the female becomes a paralectotype. Treated as a synonym of *B. lucilinea* by Schaus (1901: 271), who was followed by Draudt (1932: 915) and Becker (2014: 3), it was considered a good species by Schintlmeister (2013: 50). They are very similar indeed, and sympatric along most of their range, except for Central America, from where *B. lucilinea* is not represented in the collections. The genitalia of both *B. lucilinea* and *B. furcifera* are similar; however, the branches of uncus are longer and thinner and the tooth on sacculus smaller and sharper in *B. furcifera*. Despite the differences being small, they are consistent even between sympatric specimens. Specimens from Central America show wing pattern less contrasting, looking similar to *B. lucilinea*, but their genitalia are clearly *B. fulgurifera*.

According to I. Chacón, Museo Nacional de Costa Rica (pers. comm.), "Montes de la Candelaria", a name not in use since the 60's of the last century, refers to a series of mountains southwest of San Ignacio de Acosta, bordering the La Candelaria river. The two highest elevations are "Cerro el Cedral" (1634 m) and "Cerro Caraigres (2740 m).

Bardaxima donatian (Schaus, 1928)

Figs 9, 10, 45–47

Elymiotis donatian Schaus, 1928: 6. Lectotype male, GUYANA: [no further data] (USNM), designated by Schintlmeister (2016: 171) [examined].

Diagnosis. Male (Fig. 9) FW length 22–25 mm (50–58 mm wingspan), female (Fig. 10) FW length 25–30 mm (56–66 mm wingspan). FW gray mottled brown; blackish dash from end of cell to termen, between R5-M1, with a short white dash in the middle; wide paler band along costa, from base to termen. HW whitish, thinly dusted gray, more densely towards margins; abdomen fuscous, distal margin of 8th male sternite (Fig. 47) with a deep incision. Male genitalia (Fig. 45): uncus short, forked distad. Socii nearly as long as uncus. Valva short and wide, costa with small tooth distad; sacculus broad, broadly expanded distad, with series of small teeth ventrad; a triangular, denticulate plate at middle. Aedoeagus (Fig. 46) contorted, apex forked.

Material studied. Type; 23 males (g.s. 5604), 4 females (VOB); 4 males (AMC).

Distribution. From Guyana, throughout central Brazil, to the southern coast of Bahia.

Remarks. Easily distinguished from *B. lucilinea* and *B. fulgurifera* by the whitish HW.

ionia-group

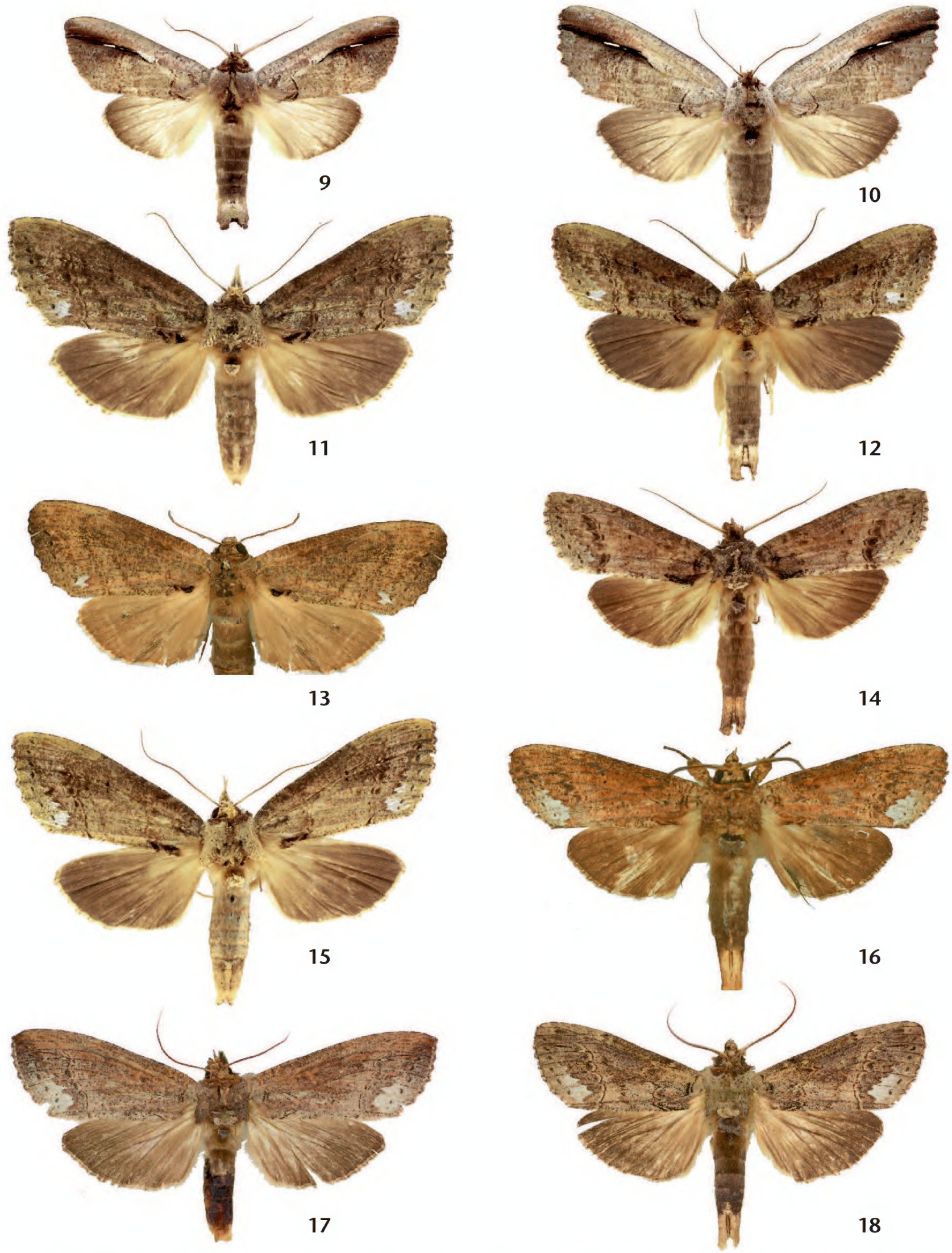
The species included in this group have the area along termen of FW dorsally slightly paler than the ground color, or with a small white dot next to tornus. The group includes three species, all occurring in Brazil (*B. ionia*, *B. marcida* and *B. subrutila*).

Bardaxima marcida (C. Felder, 1874)

Figs 11–13, 51–53

Nystalea marcida C. Felder, 1874: pl. 98, fig. 2. Holotype female, COLOMBIA: Bogota (NHMUK) [examined].

Diagnosis. Male (Fig. 12) FW length 25–27 mm (56–62 mm wingspan), female (Figs 11, 13) FW length 30–33 mm (68–74 mm wingspan). FW gray, minutely mottled with dark fuscous and blackish scales; white patch on tornus small; basal, ante- and postmedial bands double, edged black; row of black dots between veins before termen; pair of black dots at end of cell. HW fuscous, cilia pale. Distal margin of 8th male sternite (Fig. 53) with a deep incision at middle. Male genitalia (Fig. 51): uncus branching into four prongs, forming, with socii arms, a six-prong group. Valva with sacculus nearly as long as valva, broad, with two strong teeth: a dorsal at distal third and a ventral at middle. Aedoeagus (Fig. 52) slightly curved ventrad, apex expanded laterally into a pair of small, sharp pointed teeth.



Figures 9–18. *Bardaxima* specimens, dorsal view: (9, 10) *B. donatian*: (9) male, Porto Seguro, Bahia, Brazil; (10) female, Porto Seguro, Bahia, Brazil. (11–13) *B. marcida*: (11) female, Camacan, Bahia, Brazil; (12) male, Camacan, Bahia, Brazil; (13) female holotype, Colombia. (14–18) *B. ionia*: (14) male, Planaltina, Distrito Federal, Brazil; (15) female, Camacan, Bahia, Brazil; (16) male lectotype, Brazil; (17) female, Sete Lagoas, Minas Gerais, Brazil; (18) male, Camacan, Bahia, Brazil.

Material studied. 8 male (g.s. 5613, 5614), 5 females (VOB); 1 male, 1 female (AMC).

Distribution. Costa Rica to southern Brazil (Espírito Santo).

Remarks. Very similar to *B. ionia*, easily distinguished by the small white patch on tornus of FW dorsally and by the very distinct genitalia.

Bardaxima ionia (Druce, 1900)

Figs 14–19, 48–50

Heterocampa ionia Druce, 1900: 515. Lectotype male, [BRAZIL]: AM, Manaus (NHMUK), here designated [examined].

Symmerista albolimbata Dognin, 1909: 83. Holotype male, VENEZUELA: [Distrito Capital], Caracas [no further data] (*illegible*) (USNM) [examined]. Syn. nov.

Gisara ambigua Dyar, 1908: 49. Holotype male, PERU: [Callao], Callao (*Pusey*) (USNM), [examined]. Syn. nov.

Gisara metcalfi Schaus, 1928. Lectotype male, BOLIVIA: [Santa Cruz], Rio Songo, 750 m (*Fassl*) (USNM), designated by Schintlmeister (2016: 322) [examined]. Syn. nov.

Diagnosis. Male (Figs 14, 16, 18) FW length 23–27 mm (52–60 mm wingspan), female (Figs 15–17, 19) FW length 32 mm (70 mm wingspan). FW gray; patch on tornus before termen paler than ground color or whitish; postmedial band double, edged outwards with black lunules in vein interspaces. HW gray, paler towards base, cilia white. Distal margin of 8th male sternite (Fig. 50) slightly round. Male genitalia (Fig. 48): uncus long, broad, branched at distal half. Socii large, distal third bent ventrad, apex of branches with small teeth. Valva with costa straight, slightly incurved near apex; sacculus thin, longer than valva, with two long, thin branches at end, ventral one slightly curved before sharp pointed tip. Aedoeagus (Fig. 49) straight, slightly expanded and branched distad.

Material studied. Types; 10 males (g.s. 4589, 5611, 5612), 4 females (VOB).

Distribution. Costa Rica to Venezuela, Peru, and Bolivia east to São Paulo, Brazil.

Remarks. *Heterocampa ionia* was described from a pair of specimens, the lectotype and a female, that belongs to *Disphragis occulta* (Schaus, 1905) (Becker 2014: 6). The patch on dorsum, before termen, varies from white, as in the type of *G. metcalfi*, to almost the same as the ground color, as in *G. ambigua,* looking similar to *B. subrutila*, but easily distinguished by the black mark at end of FW cell: a small round dot in *B. ionia*, whereas a short, vertical dash in *B. subrutila*. The female from Costa Rica (Fig. 21) is an exact match to the female lectotype of *G. metcalfi*, from Peru, illustrated in Schintlmeister (2016: 322). *Gisara ambigua* is not more than a rubbed specimen of *B. ionia*. As Callao, a city close to Lima, Peru, is located in the desert coast along the Pacific side of South America, almost devoid of vegetation, it is very likely that the type specimen of *G. ambigua* is mislabeled.

Bardaxima subrutila (Dognin, 1908)

Figs 21, 22, 54–56

Gisara subrutila Dognin, 1908: 171. Lectotype male, FRENCH GUIANA: St. Laurent du Maroni ([Le Moult]) (USNM), designated by Schintlmeister (2016: 504) [examined].

Diagnosis. Male (Fig. 21) FW length 25 mm (58 mm wingspan), female (Fig. 22) FW length 30 mm (68 mm wingspan). FW olive fuscous; basal band reduced to a thin, well defined, black line; small, vertical, black dash at end of cell; female with white patch on tornus. HW fuscous. Abdomen fuscous dorsally, pale yellow ventrally; fuscous band dorsally along middle, broader at base, tapering to 5th segment, remaining segments banded fuscous on articulations. Distal margin of 8th male sternite (Fig. 56) with a deep incision towards a heart-shaped structure at middle; proximal margin with pair of long, thin apophyses. Male genitalia (Fig. 54): uncus branched into pair of curved, laterally flat processes. Valva short, triangular, base wider than length; costa slightly sinuate; sacculus narrow, as long as valva, rounded apically. Aedoeagus (Fig. 55) short, broadly expanded distally into a complex structure.

Material studied. Type; 3 males (g.s. 5609), 3 females (VOB); 1 male, 1 female (AMC).

Distribution. French Guiana and Brazil, in the Amazon region, south to Bahia.

Remarks. Presumably related to *B. ionia* but easily distinguished by the thin black line at base of FW, and the short, vertical, black line at end of cell, and by the unique shape of genitalia, as easily seen in the illustrations.

procne-group

This group includes the species with a large, white patch next to tornus of FW. It is represented in Brazil by three species (*B. procne*, *B. sambana* and *B. terminalba*), by *B. brauni* in Colombia, and by *B. brewsteri* in Costa Rica.

Bardaxima procne (Schaus, 1892)

Figs 31–33, 57–59

Symmerista procne Schaus, 1892: 336. Lectotype female, BRAZIL: [RJ]], Corcovado (USNM), designated by Schintlmeister (2016: 432) [examined].

Gisara meyeri Schaus, 1928: 32. Lectotype male, FRENCH GUIANA: St. Laurent (USNM), designated by Schintlmeister (2016: 323) [examined]. Syn. nov.

Diagnosis. Male (Fig. 31) FW length 23–25 mm (52–56 mm wingspan), female (Figs 32, 33) FW length 30–33 mm (66–72 mm wingspan). FW gray, minutely mottled blackish; large white patch on tornus; termen dark fuscous, from apex to Cu1. Thorax, dorsally, with a conspicuous white dot at middle. HW dark gray, cilia white. Distal margin of 8th male sternite (Fig. 59) shallowly concave. Male genitalia (Fig. 57): uncus thin, tapering distad to a sharp tip; socii small, thin.

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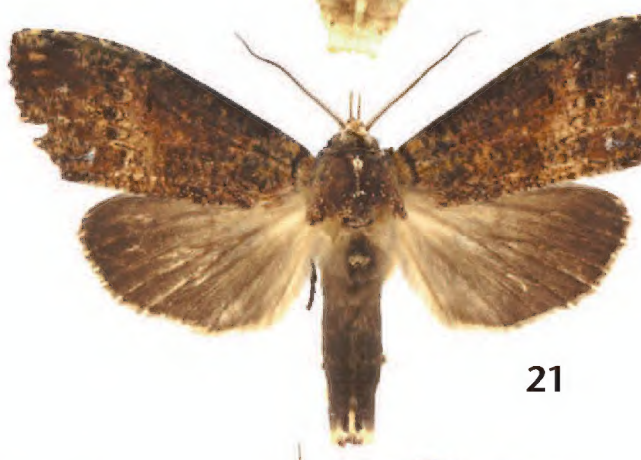
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Figures 19–30. *Bardaxima*, *Stragulodonta* and *Elasmia* specimens, dorsal view: (19) *B. ionia*, female, Turrialba, Cartago, Costa Rica; (20) *B. dissona*, male holotype, Peru; (21, 22) *B. subrutila* male, female, Camacan, Bahia, Brasil. (23–25) *B. terminalba*: (23, 24) male, female, Campos do Jordão, São Paulo, Brazil; (25) male holotype, São Paulo, São Paulo, Brazil. (26–28) *S. stragula*: (26) male, Jenaro Herrera, Loreto, Peru; (27) female, Vilhena, Rondônia, Brazil; (28) male holotype, Surinam. (29, 30) *E. perses*: (29) male, Cacaulândia, Rondônia, Brazil; (30) female, Planaltina, Distrito Federal, Brazil.

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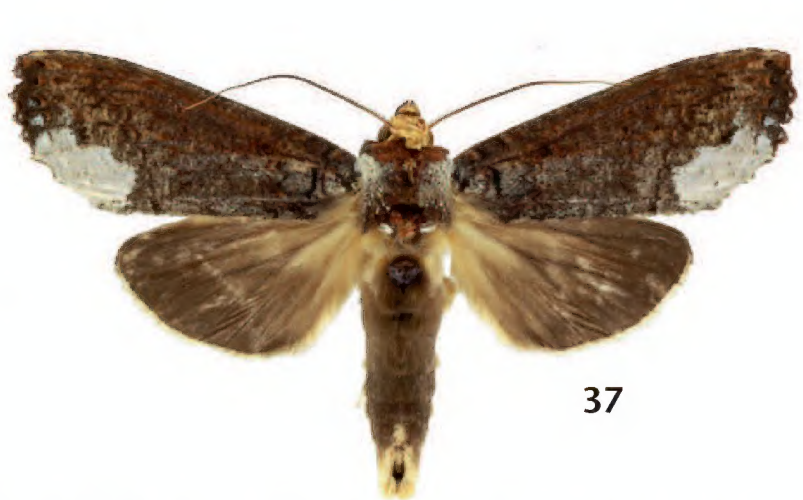
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Figures 31–38. *Bardaxima* specimens, dorsal view: (31–33) *B. procne*: (31) male, Vilhena, Rondônia, Brazil; (32) female, Cacaulândia, Rondônia, Brazil; (33) female, Jenaro Herrera, Loreto, Peru. (34–38) *B. sambana*: (34) male holotype, Costa Rica; (35) male, Porto Seguro, Bahia, Brazil; (36) female, Guaramiranga, Ceará. Brazil; (37) male, Los Bancos, Pichuincha, Ecuador; (38) male, Esquipulas, Chiquimula, Guatemala.

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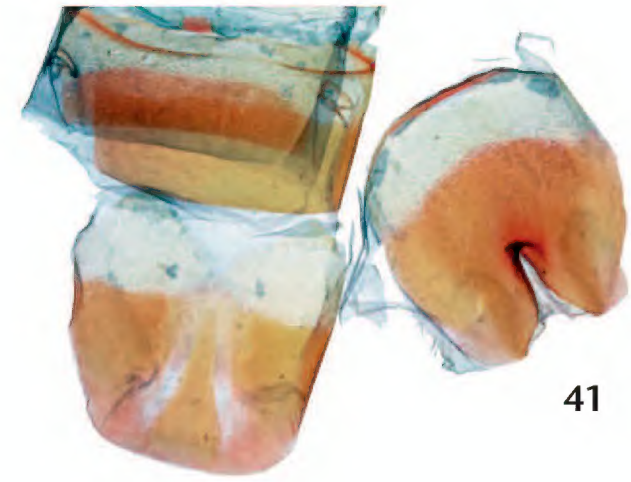
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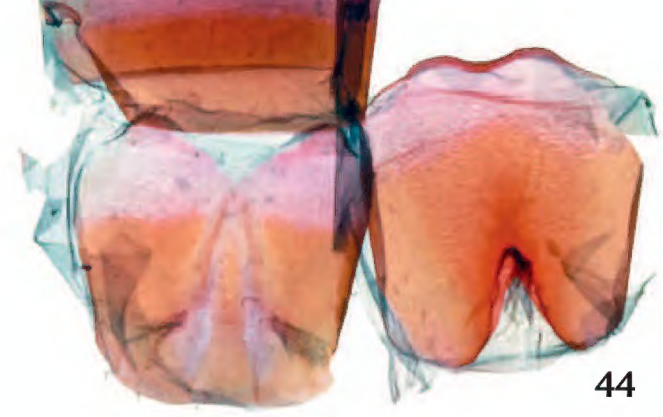
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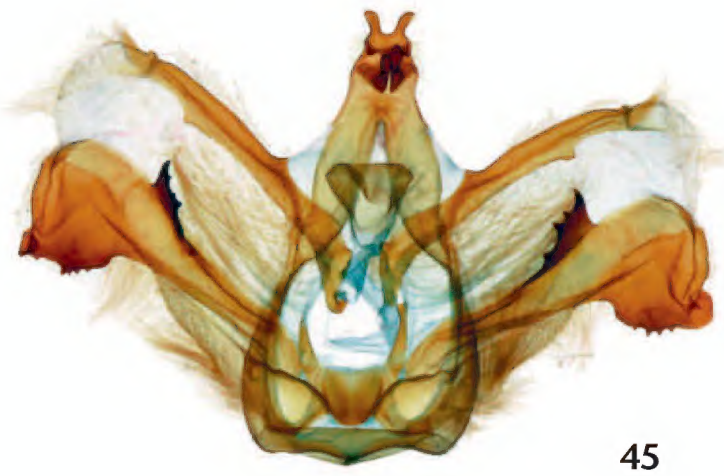
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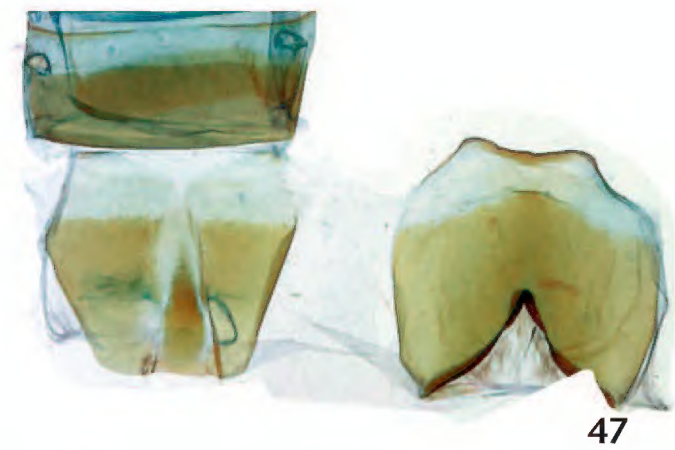
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Figures 39–50. *Bardaxima*, male genitália, aedoeagus, 8th male abdominal segment, ventral view: (39–41) *B. lucilinea*; (42–44) *B. fulgurifera*; (45–47) *B. donatian*; (48–50) *B. ionia*.

Valva broad, costa slightly curved at distal third; sacculus long, narrow, reaching tip of valva, with pair of thin, sharp pointed teeth at middle. Aedoeagus (Fig. 58) curved ventrad; three sharp pointed teeth at apex; vesica smooth.

Material studied. Types; 12 males (g.s. 4536, 5615), 2 females (VOB); 2 males (AMC).

Distribution. French Guiana to Brazil, throughout the Amazon region, south to São Paulo.

Remarks. Easily distinguished from other similar species by the conspicuous white dot on the center of thorax, dorsally. Specimens tend to be darker (= *G. meyeri*) towards the northern portion of the distributional range. Genitalia of both phenotypes, as well of intermediate phenotypes, are identical. It is very likely that *B. brauni*, the next species, from Colombia, is just a local, darker phenotype of *B. procne*.

Bardaxima brauni (Schaus, 1928)

Gisara brauni Schaus, 1928: 33. Lectotype male, COLOMBIA: [Tolima]: San Antonio (Fassl) (USNM), designated by Schintlmeister (2016: 85) [examined].

Diagnosis. Male 60 mm wingspan. FW dorsally dark fuscous, irrorated white; an elongate white patch, mixed with sparse blackish scales, on tornus. HW dark gray, cilia white.

Material examined. Lectotype (image).

Distribution. Colombia.

Remarks. The white irroration on FW dorsally distinguishes this taxon from all the species in the *procne* group, where it belongs. It's pattern indicates, however, that it might be just a darker, local form of *B. procne*. Genitalia should be checked to confirm this. The lectotype is illustrated in Schintlmeister (2016: 85).

Bardaxima dissona Draudt, 1932

Figs 20, 63–65

Bardaxima dissona Draudt, 1932. Holotype male, [PERU: Loreto], Iquitos (*Hahnel*) (MfN) [image examined].

Diagnosis. Male (Fig. 20) FW length 20 mm (46 mm wingspan). FW dorsally with area basad of postmedial band dark gray; light gray distad of this band; a conspicuous white mark next to base. HW pale fuscous. Male genitalia (Figs 63, 64): uncus with tip forked. Valva with sacculus bearing two sharp pointed teeth at middle, directed dorsad.

Material examined. Holotype (images).

Distribution. Peru, Loreto (Iquitos).

Remarks. The conspicuous white mark at the base of FW is unique in the genus. The pair of teeth on the middle of sacculus indicates a close relationship with *procne*.

Bardaxima sambana (Druce, 1895) stat. rev.

Figs 34–38, 60–62

Nystalea sambana Druce, 1895: 50. Holotype female, COSTA RICA [San José]: "Candelaria Mts." (NHMUK) [examined].

Gisara brewsteri form *panamensis* Draudt, 1932: 987. Holotype male, PANAMA: Chiriqui (MfH) [not examined]. Syn. nov.

Bardaxima bolivari Thiaucourt, 2010: 105. Holotype male, VENEZUELA: Bolivar, pistes Sta. Elena-Icaburu/Betina, vii.1989 (Bleuzen) [not examined]. Syn. nov.

Bardaxima belizensis Thiaucourt, 2010: 106. Holotype male, BELIZE: Augustine Pine Mt. Ridge, 500 m, 24–25.ix.1973 (Becker) [not examined]. Syn. nov.

Bardaxima coloradorum Thiaucourt, 2010: 106. Holotype male, ECUADOR: Pichincha, Santo Domingo de los Colorados, Tinalandia, 650 m, 19–22.i.1975 (Descimon et. al.) [not examined]. Syn. nov.

Diagnosis. Male (Figs 35, 37, 38) FW length 22–27 mm (50–60 mm wingspan), female (Figs 34, 36) FW length 27–30 mm (60–68 mm wingspan). FW dorsally gray, minutely mottled with blackish scales; large white patch on dorsum; postmedial band double. HW gray, darker towards margins, cilia white. Distal margin of 8th male sternite (Fig. 62) slightly rounded. Male genitalia (Fig. 60): uncus short, blunt, expanded at middle. Socii long, thin, curved ventrad. Valva with costa nearly straight, broadened towards base; sacculus narrow, as long as valva; a strong tooth at middle, another at the end, directed dorsad. Aedoeagus (Fig. 61) nearly straight, expanded distad, with a long, bent tooth, and two smaller laterally.

Material studied. Type of *N. sambana*; 20 males (g.s. 4272, 4585, 5605–5608), 6 females (VOB); 1 male (AMC).

Distribution. From Belize and Guatemala, through Costa Rica and Ecuador, Bolivia, and east to Brazil (Bahia and Distrito Federal).

Remarks. This widespread species was synonymized under *B. procne* by Schaus (1901: 310), a similar species, from South America, that does not reach Central America. They are very similar indeed but *B. sambana* does not have the conspicuous white dot on thorax that is observed in *B. procne*. There is a male, from Belize, collected by the present author, together with the holotype of *B. belizensis*, that matches exactly the type of *B. sambana*. The illustration of the type of *G. panamensis* (Draudt 1932: pl. 152a) also matches the types of both *B. sambana* and *B. belizensis*. It is very likely that *B. brewsteri* is merely a local color form of *B. sambana*, with whitish HW. The long series of specimens examined show slight differences in genitalia, as shown in Thiaucourt's work (2010), but not more than what would be expected in specimens from different localities of a widely distributed species. "Candelaria Mts" (see above under *B. fulgurifera*).

Bardaxima brewsteri (Schaus, 1928)

Gisara brewsteri Schaus, 1928. Lectotype male, COSTA RICA: [San José], San José, 4,000 ft (Schaus) (USNM), designated by Schintlmeister (2016: 86) [examined].

Diagnosis. Male 57 mm wingspan. FW dorsally gray; ante- and postmedial bands diffuse, ill-defined; elongate white patch on tornus. HW white, veins marked gray towards margin.

Material examined. Lectotype.

Distribution. Costa Rica.

Remarks. Identical to *B. sambana*, except for the whitish HW. Perhaps not more than a local color form of the latter species. Lectotype illustrated in Schintlmeister (2016: 86).

Bardaxima terminalba Jones, 1908

Figs 23–25, 66–68

Bardaxima terminalba Jones, 1908: 168. Holotype male, BRAZIL: SP, São Paulo (Jones) (NHMUK) [examined].

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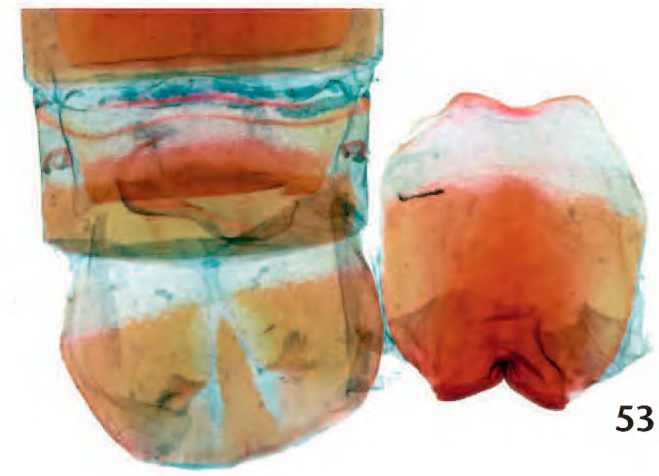
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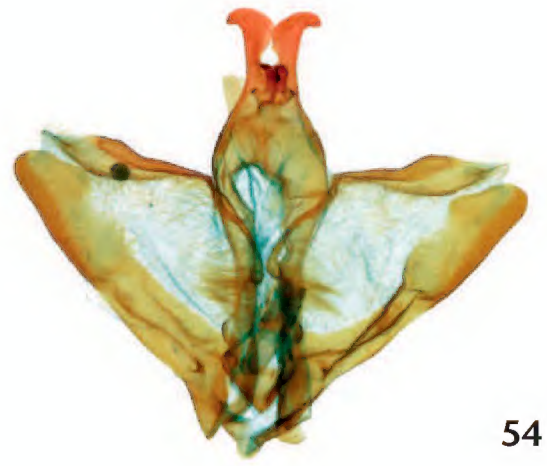
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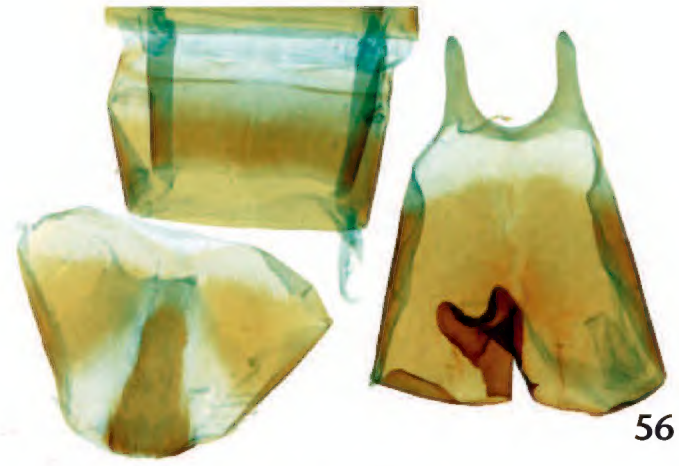
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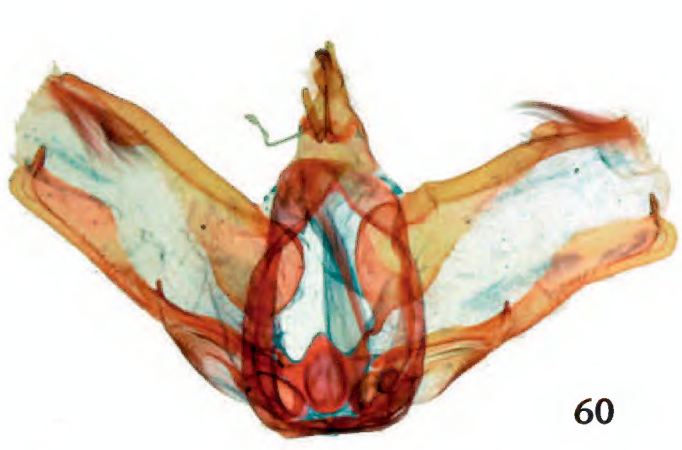
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Figures 51–62. *Bardaxima*, male genitalia, aedoeagus, 8th male abdominal segment, ventral view: (51–53) *B. marcida*; (54–56) *B. subrutila*; (57–59) *B. procne*; (60–62) *B. sambana*.

Navarcostes oakley Schaus, 1939. Holotype male, BRAZIL: "St. Catherines" (SC) [no further data] ([Hoffmann]) (USNM) [examined]. Synonymized by Moser and Thiaucourt (2006: 698).

Diagnosis. Male (Figs 23, 25) FW length 18–20 mm (42–46 mm wingspan), female (Fig. 24) FW length 23 mm (52 mm wingspan). FW dorsally whitish, minutely mottled dark gray; narrow white patch on dorsum and along termen mixed with blackish scales. HW gray, lighter towards base; cilia white. Male genitalia (Fig. 66): uncus short, blunt, distal margin slightly concave. Socii long, twisted ventrad at distal third. Valva short, broad, with costa slightly

curved; sacculus broad, as long as valva, with pair of teeth at middle. Aedoeagus (Fig. 67) long, thin; vesica with a strong cornutus.

Material studied. The holotypes of both taxa; 7 males (g.s. 5616), 3 females (VOB); 7 males, 2 females (AMC).

Distribution. Brazil, in the cool, high elevations of the Atlantic Forest, from São Paulo to Santa Catarina.

Remarks. This is the smallest species in the genus; very similar to *Navarcostes* species, the reason it was originally included in that genus; however, it is easily distinguished by the antenna: short and long pectinated in the *Navarcostes* species. The printed locality label "St. Catherines, Brazil", of *N. oakley*, is typical of all the material collected by Fritz Hoffmann, a German naturalist, who collected in Santa Catarina and in Espírito Santo, Brazil, in the beginning of the 20th century.

Stragulodonta gen. nov.

http://zoobank.org/92DD090D-3496-438C-B2E8-AE51F34F861B

Diagnosis. Sexes highly dimorphic in size: females nearly twice as large as males. Antennae pectinate to near tip in both sexes. Male genitalia distinct from everything known for the subfamily, as shown in the illustrations (see description below under *S. stragula*).

Distribution. South America.

Etymology. A combination of *H. stragula*, the type-species, and *Notodonta*; feminine.

Remarks. The combination of pectinate antennae in both sexes with the lunular mark at end of cell is unique in the New World Notodontidae.

Stragulodonta stragula (Möschler, 1883) comb. nov.

Figs 26–28, 69–71

Heterocampa stragula Möschler, 1883: 342. Holotype male, SURINAM: Paramaribo (MfN) [image examined].

Bardaxima belua Draudt, 1932: 915. Syntypes: 1 male, 2 females, PERU: [Pasco], Pachitea; BRAZIL: [PA], Santarém (MfN) [image examined]. Syn. nov.

Diagnosis. Male (Figs 26, 28) FW length 18–22 mm (42–50 mm wingspan), female (Fig. 27) FW length 30–32 mm (68–72 mm wingspan). Head, patagia and proximal half of thorax dorsally dark fuscous, caudal half and tegulae pale yellow. FW dorsally olivaceous; black lunule at end of cell, followed by a round, pale blotch; postmedial band double, followed by dark area with distal edge sinuous. HW dark fuscous, cilia pale. Abdomen dorsally dark fuscous, with a pale band from 2nd segment to tip. Male genitalia (Fig. 69): uncus long, expanded to a nearly round head. Socii large, arms flat laterally, strongly curved at base; twice as long as wide. Valva with costa broadly expanded at base, with short, digital process dorsad; sacculus thin, as long as valva; a narrow bridge connecting costa to sacculus, next to apical margin. Aedoeagus (Fig. 70) short, thick, with a short blunt process laterally.

Material studied. Three males (g.s. 5617), 2 females (VOB).

Distribution. Surinam, Ecuador, Peru and Brazil, in the Amazonian lowlands.

Remarks. Draudt presumably was misled by the larger size of the females when he described *B. belua*.

Elasmia perses (Druce, 1900) comb. nov.

Figs 29, 30, 72–74

Heterocampa perses Druce, 1900: 516. Lectotype female, [BRAZIL]: Amazonas, Manaus (NHMUK), herein designated [examined].

Bardaxima demera Schaus, 1901: 271. Lectotype female, GUYANA: Georgetown, Demerara (Schaus) (USNM), designated by Schintlemeister (2016: 154) [examined]. Synonymized by Draudt (1932: 915).

Diagnosis. Male (Fig. 29) FW length 17–22 mm (38–50 mm wingspan), female (Fig. 30) FW length 24–26 mm (54–60 mm wingspan). FW dorsally whitish, densely dusted fuscous; a small blackish dot at end of cell, a round, whitish patch at apex, containing a small, triangular, black mark. HW fuscous. Distal margin of 8th male sternite (Fig. 74) falcate, proximal margin convex, sinuous. Male genitalia (Fig. 72): uncus constricted along middle, expanded to a broad head distad. Socii half as long as uncus, arms tapered distad to a sharp tip. Valva subtriangular, broad basally; costa narrow, straight; sacculus ill-defined; transtilla arms half as long as valva, curved ventrad, sharp pointed, ventral margin serrate. Aedoeagus (Fig. 73) long, expanded from middle to apex; vesica spinulate.

Material studied. Both lectotypes, 5 males (g.s. 4159, 5618), 3 females (VOB); 2 males (AMC).

Distribution. Costa Rica, Guianas, throughout Brazil (Amazonas) as far south as Santa Catarina.

Remarks. Both taxa were described from an unspecified number of females. The original description of *H. perses* was presumably based on a single female in the NHMUK, here designated as lectotype (see above). According to the male genitalia, this species certainly does not belong in *Bardaxima*. The presence of a digit-shaped transtilla is shared, in the Nystaleinae, with the species currently included in *Elasmia* Möschler, 1886, the reason for the new combination.

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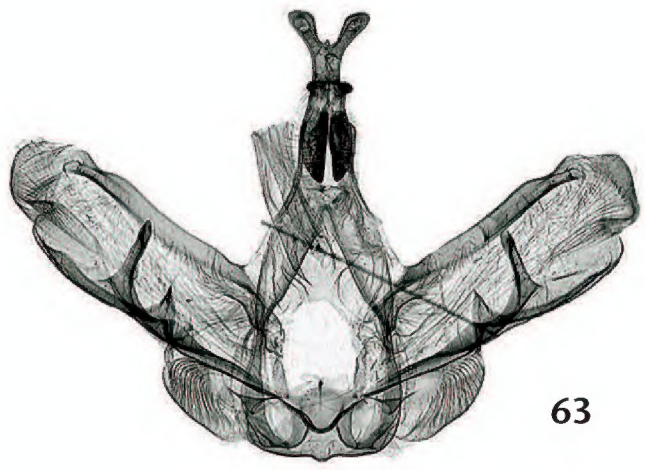
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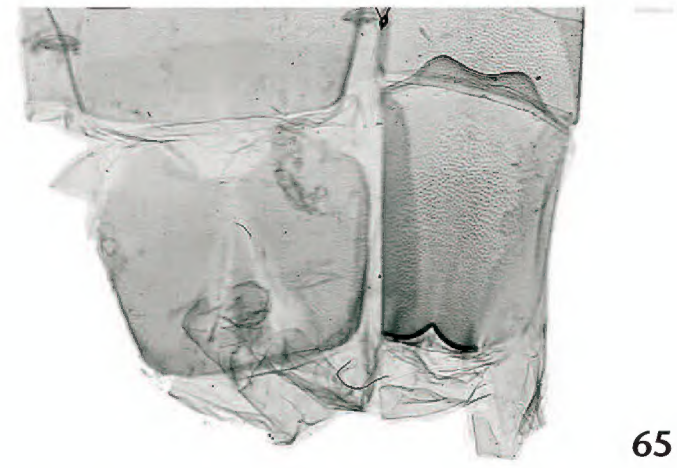
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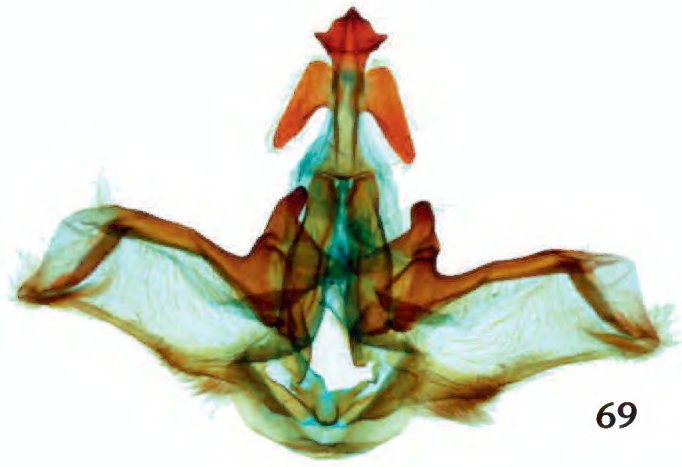
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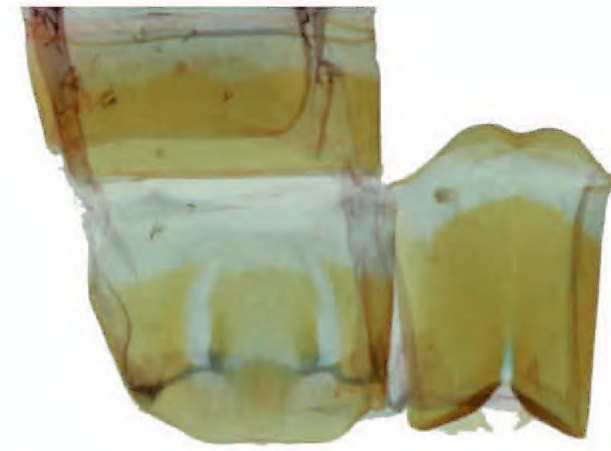
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Figures 63–74. *Bardaxima*, *Stragulodonta*, *Elasmia*, male genitalia, aedoeagus, 8th male abdominal segment, ventral view: (63–65) *B. dissona*; (66–68) *B. terminalba*; (69–71) *S. stragula*; (72–74) *E. perses*.

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